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10/661,757	09/12/2003	Christopher K. Davey	81091093	8156

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EXAMINER

OLSEN, KAJ K

ART UNIT	PAPER NUMBER
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1795

MAIL DATE	DELIVERY MODE
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08/08/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/661,757

Applicant(s)

DAVEY ET AL.

Examiner

KAJ K. OLSEN

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1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period **will** apply and **will** expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply **will**, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 May 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 8, 12-14 and 16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-5 and 16 is/are allowed.
- 6) ☒ Claim(s) 6, 8, 12-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 6, 8, and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimasaki et al (USP 5,740,675) in view of Seidenfuss (USP 5,929,328) and Jelden et al (USP 5,592,815).
3. Shimasaki discloses a system and method for determining a temperature of exhaust gas from an engine comprising an exhaust gas sensor 52 having an electric heating coil where said sensor communicates with exhaust gas, an electrical circuit for generating a signal indicative of the resistances of said heating coil when said coil is not de-energized, and a controller receiving said signal and calculating said temperature of said exhaust gas based on said signal. See fig. 1, abstract, and col. 5, l. 66 through col. 6, l. 40. See also fig. 12 and 13 and col. 7, l. 39 through col. 8, l. 7 for an embodiment where an infinitesimal current is utilized (i.e. the heater is de-energized). Shimasaki further discloses that the controller generates a duty cycle to successively energize and de-energize said coil. See col. 5, ll. 8-18. However, Shimasaki does not explicitly disclose that the controller calculates the temperature during a plurality of successive de-energized periods of the duty. Rather Shimasaki in the embodiment of fig. 13 utilizes switches separate from the duty cycle to affect temperature measurement. However, Seidenfuss teaches in an alternate temperature sensing means for an exhaust gas heater that the temperature measurement can be interfaced with any duty cycle for the heater. In particular, Seidenfuss

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utilizes a single switch T1 that can both de-energize the heater and allow for the measurement of a current I_M analogous to the infinitesimal current of Shimasaki. See fig. 1 and 2 and col. 2, l. 55 through col. 3, l. 18. This is in contrast to Shimasaki, which requires three switches, two (62, 66) for the measurement of the infinitesimal current and one (Tr) for control of the duty cycle. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Seidenfuss for the system and method of Shimasaki because the teaching of Seidenfuss required fewer switches, thereby simplifying circuit construction. In addition, the circuit of Seidenfuss obviates the need for a measuring resistor that can withstand the high current flows needed for the heater operation. See col. 2, ll. 8-15 and compare the prior art fig. 3 with fig. 1 of Seidenfuss and note that the prior art fig. 3 is analogous to the arrangement of fig. 3 and 13 of Shimasaki. Hence, it would have been further obvious to rely on the teaching of Seidenfuss for the circuitry of Shimasaki so as to avoid the use of a measuring resistor that must withstand the high heater currents. Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize a measurement coordinated with the heater duty cycle, like that taught by Seidenfuss, for the system or method of Shimasaki for the added benefit that the duty cycle of the heater not be altered by the temperature measurement. In particular, Shimasaki presumably has set the duty cycle for the heater to a particular level that provides a desired temperature control. However, if any temperature measurement of Shimasaki would happen to occur during a time when the heater is supposed to be on (i.e. the ECU has turned switch Tr on), then the temperature measurement of Shimasaki would alter the effective duty cycle for the heater because the measurement means would have de-energized the heater irrespective of the duty cycle set for

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switch Tr. Utilizing Seidenfuss, which only measures a temperature when the heater was supposed to be off anyway would thereby prevent an altering of the effective heater duty cycle.

4. With respect to the temperature measurement being calculated during a plurality of successive de-energized periods, the temperature calculation routine of Shimasaki is apparently only performed a single time for the purpose of either calculating an appropriate VEHC and TON when Tcat is between A and B or determining that no heater current supply is necessary for the EHC unit. However, Jelden teaches that temperature measurements both before and after a catalyst can be utilized for monitoring the conversion rate of the catalyst. See fig. 2 and col. 1, ll. 37-64. Because Shimasaki has already provided a temperature sensor within the exhaust line for determining whether current need be supplied to the heater catalyst upon engine start up, then it would have been obvious to one of ordinary skill in the art at the time the invention was being made to extend the utility of that temperature measurement device other uses of temperature sensor in exhaust line known in the art, such as for determining the catalyst efficiency as suggested by Jelden, to yield the predictable result of providing an appropriate measure of the catalyst efficiency as well. With respect to monitoring this temperature in successive de-energized periods of the heater duty cycle, Shimasaki already discloses the use of a duty cycle for its heater (col. 5, ll. 5-18) and Seidenfuss teaches only monitoring the temperature of a heater when the heater is de-energized so as to avoid the need for high current measuring resistors and to avoid the need for interrupting the normal heater cycle (col. 2, ll. 1-15 and l. 64 - col. 3, l. 9). Hence, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to provide the temperature measurements needed by Jelden during successive de-energized periods of the heater cycle.

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5. With respect to determining the oxygen content as well, the oxygen sensor is clearly also being utilized to determine the oxygen content of the exhaust gas as well. See the abstract. Furthermore, the temperature is being determined just after engine ignition and before the engine has warmed up (i.e. prior to the coolant temperature reaching a predetermined value). See Shimasaki, fig. 2 and col. 5, l. 48 through col. 6, l. 16.
6. With respect to comparing a first exhaust gas temperature to a second exhaust gas temperature, Jelden teaches the use of comparing first and second exhaust gas temperature at different locations in the exhaust gas system. See fig. 1 and col. 1, ll. 37-64.
7. With respect to an additional oxygen sensor upstream from the catalyst, Shimasaki disclose an oxygen sensor 50 upstream from the catalysts (20, 22) with oxygen sensor 52 being downstream from these catalysts. See fig. 1 and col. 4, ll. 19-35.

Allowable Subject Matter

8. Claims 1-5 and 16 are allowed.

Response to Arguments

9. Applicant's arguments filed 5-2-2008 have been fully considered but they are not persuasive. With respect to claims 6 and 12, applicant urges that Shimasaki is drawn to determining whether to enable the catalyst heater, which is precisely when the heater for the air-fuel sensor needs to be fully on. Thus, reading the temperature only during de-energized periods would effectively render the proposed combination of Shimasaki and Seidenfuss useless. This is unpersuasive on a number of levels. First, despite applicant's assertion that Shimasaki wouldn't

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want to de-energize its heater, Shimasaki explicitly suggests doing so. See col. 5, ll. 8-15 where Shimasaki teaches that its heater has a pulse-width modulated duty cycle. Hence, Shimasaki is teaching turning on and off the heater anyway irrespective of whether the oxygen sensor still needs to be warmed or not. Second, in the embodiment of fig. 13 which is what the examiner principally relied on, Shimasaki teaches that measuring the temperature of the exhaust at a time when the heater current to the sensor is not turned on provides a more correct measurement of the temperature. See col. 7, l. 65 - col. 8, l. 3. Hence, despite what applicant urges, Shimasaki teaches that it would be desirable to only measure the temperature when the sensor heater is de-energized. Finally, applicant's discussion of the rejection of claims 6 and 12 ignore the fact that Jelden is also part of this rejection and Jelden teaches that there are additional reasons for monitoring the temperature of the exhaust gas line that go beyond the specific reasons for Shimasaki. See paragraph 4 of the 2-11-2008 office action. Applicant's arguments do not address this further teaching of Jelden.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAJ K. OLSEN whose telephone number is (571)272-1344. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kaj K Olsen/
Primary Examiner, Art Unit 1795
August 8, 2008

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